REMARKS

Claims 1-14 are pending in the present application after this amendment adds new claims 10-14. Claims 1 and 5 are amended by this amendment. No new matter is added by the amendments, which are supported throughout the specification and figures. In view of the amendments and the following remarks, favorable reconsideration of this case is respectfully requested.

Claims 5-7 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. The Examiner specifically asserts that figure 10 apparently corresponds to the structure recited in claim 5, except the Examiner asserts that figure 10 does not support mixing the oscillation signal alternatively in the manner recited in claim 5.

Without admitting the veracity of this rejection, and in the interest of expediting prosecution, claim 5 has been amended. Amended claim 5 recites, *inter alia*, "one of N frequency mixers cascaded from one another which is connected to said second divider, outputs a signal having a frequency equal to a sum of said oscillation frequency and said divided frequency from said second divider, and each of the remaining (N-1) frequency mixers of said N frequency mixers outputs a sum of said oscillation frequency and an output frequency from a preceding frequency mixer of said N cascaded frequency mixers". It is respectfully submitted that amended claim 5 and its dependent claims are enabled by the specification, and therefore it is respectfully requested that the rejection be withdrawn.

Claims 5-7 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite. It is respectfully submitted that the amendment to claim 5 obviates this rejection, and it is therefore respectfully requested that the rejection be withdrawn.

Claims 1-4 and 9 stand rejected under 35 U.S.C. §103 (a) as being unpatentable over Applicant's Allegedly Admitted Prior Art (hereinafter AAAPA). Applicants respectfully traverse.

Claim 1 relates to a quadrature modulator that includes, *inter alia*, a frequency conversion block for converting the oscillation frequency to output a converted oscillation frequency; and a quadrature modulation block for receiving a baseband signal and the converted oscillation frequency. The quadrature modulation block of claim 1 includes a first frequency divider for dividing the converted oscillation frequency by a factor of two to output a pair of orthogonal signals having therebetween a phase difference of 90 degrees, first and second multipliers for modulating the pair of orthogonal signals with the baseband signal to output a pair of modulated signals, and an adder for adding the modulated signals together to output a carrier signal. In the quadrature modulator of amended claim 1, the carrier signal has a frequency different from the oscillation frequency and the converted oscillation frequency.

The Examiner asserts that all of the features of unamended claim 1 are disclosed or rendered obvious by the AAAPA. Without admitting the veracity of this assertion, and in the interest of expediting prosecution, Applicants respectfully submit that the features of amended claim 1 are not disclosed or suggested by the AAAPA. In particular, the AAAPA does not disclose that the carrier signal has a frequency different from the oscillation frequency and the converted oscillation frequency.

A feature of the present invention is that the carrier frequency is different from the oscillation frequency generated by the local oscillation frequency and the frequency of the output from the frequency conversion block. An advantage of the present invention is that, because the carrier frequency is different from the oscillation frequency and the output frequency of the

frequency conversion block, the configuration prevents the output signal of the conversion frequency block from being affected by the feedback of the carrier frequency signal which is delivered from the antenna. In this manner, the modulation accuracy of the quadrature modulator is improved. The AAAPA does not have the features of the present invention, and does not reduce the influence to the output signal of the frequency conversion block by the carrier frequency signal. Therefore, for at least this reason claim 1 is allowable.

Claim 2 relates to a quadrature modulator includes, *inter alia*, a frequency mixer for mixing outputs from said local oscillator and said frequency divider to generate a first signal having a frequency equal to a sum of said oscillation frequency and said divided frequency.

It is respectfully submitted that the Office Action does not even allege that the AAAPA discloses or suggests this feature of a frequency mixer, and therefore for at least this reason, claim 2 is allowable.

Claims 3 and 4 are allowable at least based on their dependence on claim 2.

Additionally, claim 3 includes the feature that the frequency conversion block further includes a band-pass-filter (BPF) for removing an image signal from the first signal. It is respectfully submitted that this feature is not disclosed or suggested in the AAAPA, and therefore for at least this additional reason claim 3 is allowable.

Claim 9 relates to a quadrature modulator that includes, *inter alia*, a frequency conversion block for multiplying the oscillation frequency by a factor of (2N+1)/2 and a quadrature modulation block. The frequency conversion block of claim 9 includes a band-pass-filter (BPF) for removing an image signal from the first signal, and an output signal from the band-pass-filter (BPF) of the frequency conversion block is supplied directly as an input signal to

the first frequency divider of the quadrature modulation block. Furthermore, in claim 9, the quadrature modulator does not include a frequency multiplier.

It is respectfully submitted that the AAAPA does not disclose or suggest a quadrature modulator in which an output signal from the band-pass-filter (BPF) of the frequency conversion block is supplied directly as an input signal to the first frequency divider of the quadrature modulation block. In fact, the specification specifically indicates that such a feature is not disclosed in the AAAPA. (Specification; page 8, lines 12-23). Therefore, for at least this reason claim 9 is allowable.

Claims 5-8 stand rejected under 35 U.S.C. §103 (a) as being unpatentable over AAAPA in view of United States Patent No. 3,644,827 to Landefeld (hereinafter Landefeld). Applicants respectfully traverse.

Claim 5 relates to a quadrature modulator that includes, *inter alia*, a local oscillator for oscillating at an oscillation frequency. In the quadrature modulator of amended claim 5, one of N frequency mixers cascaded from one another, which is connected to said second divider, outputs a signal having a frequency equal to a sum of said oscillation frequency and said divided frequency from said second divider, and each of the remaining (N-1) frequency mixers of said N frequency mixers outputs a sum of said oscillation frequency and an output frequency from a preceding frequency mixer of said N cascaded frequency mixers.

The Examiner admits that the AAAPA does not disclose N being equal to more than 2 or N frequency mixers cascaded from one another. (Office Action; page 5, line 20-21). The Examiner asserts that these features are disclosed in Landefeld. However, the combination of the AAAPA and Landefeld is improper since no motivation for combining the references is provided in the Office Action or either of the references. Furthermore, Applicants respectfully submit that

the feature of amended claim 5 that each of the remaining (N-1) frequency mixers of said N frequency mixers outputs a sum of said oscillation frequency and an output frequency from a preceding frequency mixer of said N cascaded frequency mixers is not disclosed or suggested by either of the AAAPA or Landefeld. Therefore claim 5 is allowable.

Claims 6 and 7 are allowable at least based on their dependence on claim 5.

Claim 8 relates to a method that includes, *inter alia*, multiplying the oscillation frequency by a factor of (2N+1)/2 using N frequency mixers and modulating the orthogonal carrier waves with a digital baseband signal to output a carrier signal having the carrier frequency.

It is respectfully submitted that neither of the AAAPA nor Landefeld discloses or suggests these feature of claim 8, and therefore claim 8 is allowable. Additionally, as discussed above, the combination of the AAAPA and Landefeld is improper since no motivation for combining the references is provided in the Office Action or either of the references. Therefore claim 8 is allowable.

New claims 10-12 depend from claim 1 and are therefore allowable for at least the same reasons as claim 1 is allowable.

New claim 13 relates to a method that includes, *inter alia*, generating an oscillation frequency and converting said oscillation frequency to output a converted oscillation frequency. In the method of new claim 13, the carrier signal has a frequency different from the oscillation frequency and the converted oscillation frequency.

It is respectfully submitted that none of the cited references discloses or suggests that the carrier signal has a frequency different from the oscillation frequency and the converted oscillation frequency. Therefore, for at least this reason new claim 13 is allowable.

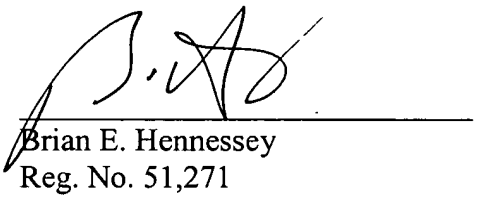
New claim 14 depends from new claim 13 and is therefore allowable for at least the same reasons as claim 13 is allowable.

CONCLUSION

In view of the remarks set forth above, this application is believed to be in condition for allowance which action is respectfully requested. However, if for any reason the Examiner should consider this application not to be in condition for allowance, the Examiner is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper may be charged to Deposit Account No. 50-1290.

Respectfully submitted,



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